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AUTHOR	Chan, Jimmy; Eyster, Erik
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ABSTRACT

This paper explains people's preferences for ethnic and racial diversity in higher education through a model based on self-interest. Although all citizens from the majority group value diversity and their own education in the same way, their preferences for the level of diversity as well as the means of achieving it depend on their competitive positions in university admissions. High-income majority citizens, who tend to have better academic qualifications than lower-income majority candidates, prefer more diversity, which they want to achieve through affirmative action. Lower-income majority candidates prefer less diversity, and they support admissions rules that partially ignore academic qualifications. Data from a CBS/New York Times opinion poll confirm these predictions. This model suggests why recently, several American universities have replaced race-conscious admissions policies with race-blind policies that de-emphasize standardized tests, with little or no effect on diversity. Income inequality and competitive admissions both make banning affirmative action more likely. (Contains 21 references.) (SM)

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Admission Impossible? Self Interest and Affirmative Action*

Jimmy Chan
Johns Hopkins University

Erik Eyster
Nuffield College, Oxford

July 17, 2002

Abstract

This paper explains people's preferences for ethnic and racial diversity in higher education through a model based on self interest. Although all citizens from the majority group value diversity and their own education in the same way, their preferences for the level of diversity as well as the means of achieving it depend on their competitive positions in university admissions. High-income majority citizens, who tend to have better academic qualifications than lower-income majority candidates, prefer more diversity, which they want to achieve through affirmative action—by displacing marginal majority candidates for marginal minority candidates. Lower-income majority candidates prefer less diversity, which they want to achieve through admissions rules that partially ignore academic qualifications. Data from a CBS/NYT opinion poll confirm these predictions. Our model suggests why recently several American universities have replaced race-conscious admissions policies with race-blind policies that de-emphasize standardized tests, with little to no effect on diversity. Income inequality and competitive admissions both make banning affirmative action more likely.

1 Introduction

Ethnic and racial diversity at American colleges and universities has recently become a major issue of political debate. Because candidates from minority groups tend to have lower high-school grades and standardized-test scores than their majority counterparts, elite colleges and professional schools cannot produce diverse student bodies simply by filling their ranks with candidates with the highest grades and test scores. Instead, they use a number of different means of achieving diversity, chief among them affirmative action—setting lower admissions standards for minority students.[1] But while a large majority of whites believe that having a racially diverse college population is important, only a minority support admissions policies that favor minority applicants.[2]

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[1] In this paper, the term "affirmative action" refers exclusively to race-conscious admissions standards; it does not include other programs that promote diversity such as minority outreach.

[2] In the context of college admissions, "minority" usually refers to African Americans, American Indians, Chicanos, and Latinos. Asian Americans are not included because they are overrepresented.

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Although much public debate has focused on the social value of diversity and the fairness of race-conscious admissions policies, scant attention has been paid to how the "costs" of affirmative action—displaced majority students—are divided among different groups of majority citizens. This paper attempts to make sense of the politics of college admissions by analyzing the distribution of affirmative action's costs. In our model, majority citizens value diversity, but not at their own expense: a majority citizen is more likely to support a program that creates ethnic and racial diversity if that program carries little risk that she herself is displaced. Our theory explains how people's support for affirmative action depends on their position vis-a-vis university admissions. It predicts not only majority citizens' preferences over the level of diversity, but also their preferences over different methods of achieving that diversity.[3]

Majority citizens from high socioeconomic classes or with high income tend to have better academic qualifications than those from low socioeconomic classes or with low income.[4] Any admissions policy that admits better-qualified candidates with higher probability than less-qualified candidates admits high-income citizens in greater proportion than low-income citizens; high-income majority candidates enjoy more of the benefits of diversity. Conditional on being admitted, low-income majority citizens are also more likely to have marginal qualifications. Thus, affirmative action, which displaces marginal majority citizens to make way for marginal minority citizens, imposes its costs disproportionately on low-income majority citizens. As a result, high-income majority citizens support affirmative action to a greater extent than low-income citizens.

Using affirmative action is not the only way that a university can admit a diverse entering class. It can also change the way it measures candidates' qualifications. Because minority citizens on average have lower qualifications than majority citizens, an admissions rule that partially ignores candidates' qualifications also produces a more diverse entering class. For exactly the same reason, it also benefits low-income majority citizens at the expense of high-income majority citizens. Hence, lower-income majority citizens prefer a noisy admissions rule to affirmative action as a means for diversity.

We use data from a CBS News/New York Times opinion poll to test the hypothesis that support for affirmative action positively correlates with socioeconomic status. Controlling for inherent taste

[3]University admissions policies do not directly affect most voters, who have finished their schooling already. In that case, we think of people voting in the interest of their children, grandchildren, etc.

[4]For example, Zwick (2001) shows that at the University of California at Santa Barbara, the correlation between SAT I scores and log income is approximately 0.3; the correlation between SAT II math and verbal scores (achievement tests) and log income is about the same. The one notable exception is the SAT II subject test, where scores are uncorrelated with income.

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for diversity, we find that respondents with a college degree are significantly more likely than those without one to believe that a college choosing between equally qualified black and white applicants should select the black one in order to improve racial balance. Furthermore, as our theory predicts, people's attitudes are sensitive to the method of achieving diversity: college graduates do not support class-based affirmative action or programs promoting diversity through channels other than affirmative action to a greater extent than non-graduates. This distinguishes our theory from other explanations for systematic differences in attitudes toward diversity across socioeconomic classes. For example, if high-income citizens prefer more diversity simply because they care more about "social justice," then they should be indifferent over all programs promoting diversity.

Our formal model sheds light on the recent history of affirmative-action policy. For several decades, the predominant means of achieving diversity in American college and universities has been affirmative action. Thomas J. Kane (1998) estimates that at the most selective American colleges and universities in 1982, African-American candidates were as likely to be admitted as white candidates with SAT scores 400 points higher. But in recent years these race-conscious admissions policies have come under a flurry of attack. In 1995, the Regents of the University of California banned race-conscious admissions. In the 1996 case *Hopwood v. Texas*, a panel of the Fifth Circuit Court of Appeals forbade race-conscious admissions at all public universities in Louisiana, Mississippi, and Texas. In the same year, California voters approved Proposition 209, which prohibits public colleges and universities from using race in any admissions or financial-aid decision.[5] Since then a series of court rulings, state legislations, and ballot referenda has banned race-conscious admissions in Washington, Georgia, and Fiorida.[6]

Banning the explicit consideration of race and ethnicity from admissions does not mean that these characteristics no longer matter. Instead, affected universities have begun to alter their admissions policies in ways favorable to minority candidates. In 1997, the Texas state legislature passed a law requiring that public universities (e.g., UT Austin or Texas A&M) admit any Texas resident graduating in the top-ten percent of her high-school class, where rank is solely determined by high-school grades. The University of California adopted a similar plan that admits the top-

[5] Although the Regents of the University of California repealed their 1995 ban in 2001, Proposition 209 still precludes affirmative action.

[6] In 1998, Washington state voters passed Proposition 200, which is identical to California's 209. In the 2001 case *Johnson v. University of Georgia*, a Federal Circuit court struck down affirmative action at the University of Georgia. Not all legal challenges to affirmative action have been successful: in the 2000 case *Gratz v. Regents of the University of Michigan*, a district court in upheld affirmative action in undergraduate admissions at the University of Michigan (while the next year in *Grutter v. Regents of the University of Michigan*, the same court struck down affirmative action from law school admissions). Likewise, in the 2000 case *Smith v. University of Washington*, the Ninth Circuit Court of Appeals upheld affirmative action in law school admissions.

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four percent of each high-school class in the state. Its Berkeley campus—the most selective one—broadened its measure of academic achievement to include several factors other than standardized-test scores. As a result, average SAT I scores at Berkeley have fallen from 1309 in 1997, the last year of affirmative action, to 1291 in 2001 (meanwhile scores nationwide rose from 1016 to 1020). Because minority citizens tend to score lower than majority citizens on many standardized tests, especially the SAT I, this raises minority enrollment. Indeed, after falling significantly immediately after the bans, minority representation at elite public universities in California and Texas has rebounded significantly under the new rules, although it remains below its affirmative-action level.[7] Florida, acting with the benefit of hindsight on California and Texas's experiences, has recently enacted a similar plan, granting admission to the top-twenty percent of each high-school class statewide.

Why do majority voters opposed to affirmative action favor other admissions policies ostensibly designed to increase minority enrollment, especially when these policies are inefficient because they fail to select the best candidates from any ethnic group? One possible explanation is that majority voters consider race-based policies unjust. But if admissions policies that explicitly benefit one race over another are unjust, why aren't those that implicitly do the same?

Our model of preferences suggests a different answer. The administrators and faculty members who govern elite universities have preferences similar to high-income majority citizens, possibly because they come from high socioeconomic groups themselves. Like high-income majority citizens, they like to achieve diversity through affirmative action but not through noisy admissions tests. When the median majority voter has different preferences, banning affirmative action provides a way to force the university to use a noisier admissions test, increasing the representation of low- and middle-income majority citizens. Indeed, Berkeley's new admissions policies have caused the share of new registrants whose fathers have no more than a high-school degree to rise from 14.5 percent in 1998 to 20.6 percent in 2001.[8]

Thus, bans on affirmative may have as much to do with distributional politics among majority voters as with preferences for diversity. Two recent economic phenomena may have contributed to the timing of the bans. First, the number of applicants to elite colleges and universities has

[7] For details, see Chan and Eyster (2001).

[8] This change spanned all racial groups. The share of fathers with no more than a high-school diploma rose from 32.4 to 37.4 percent for African Americans, 58.8 to 68.3 percent for Chicanos, 23.9 to 32.1 percent for Latinos, 15.9 to 22.5 percent for Asians, and 5.3 to 6.7 percent for whites.

In 1990, almost exactly fifty percent of Californians above 25 years old had no more than a high-school degree. Another twenty-five percent had no more than some college (no college degree). The share of Berkeley matriculants whose fathers had no more than some college rose from 24.4 to 29.8 percent from 1998 to 2001, and also encompassed all racial groups.

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been growing. Second, income inequality has been widening. In our model, each of these increases the likelihood of a ban. With admissions are sufficiently competitive, or high-income majority citizens have sufficiently high income and hence ability, the only way for low and middle-income majority citizens to gain admission is by banning affirmative action, in which case the university adopts a noisy admissions test that admits minority and low-income majority candidates alike; otherwise, high-income majority citizens fill all the places not reserved for minority candidates under affirmative action.

While banning affirmative action may improve low- and middle-income citizens' welfare relative to affirmative action, often other feasible admissions policies Pareto dominate a ban. Public policy fails because low- and middle-income citizens can ban affirmative action but cannot force universities to adopt other more efficient admissions policies. A ban can therefore be an example of "political failure" as defined by Besley and Coate (1997).

The rest of the paper is organized as follows. Section 2 introduces a model of university admissions. Section 3 analyzes majority citizens' preferences over admissions rules, both over diversity and the means of achieving it. Section 4 models the political process governing admissions. Section 5 tests some of the model's predictions using survey data. Section 6 concludes.

1.1 Related Literature

This paper is related to a literature on the unintended consequences of affirmative-action policies. Using a model of statistical discrimination in job assignment, Coate and Loury (1993) show that an equal-outcome policy that requires employers to assign minority workers to skill-intensive jobs at the same rate as majority workers may discourage minority workers from acquiring human capital, widening the equilibrium skill gap between minority and majority workers. In a related model, Fang and Norman (2001) argue that a group targeted by state-sponsored discrimination may have a stronger incentive to invest in human capital, making it better off than the group favored by the state. Lundberg (1991) shows that employers may circumvent a ban on using race to set wages by using other attributes correlated with race. She concludes that it is more efficient to regulate the average wage gap than the wage-setting process itself, for the former allows employers to use more information. Chan and Eyster (2001) make a similar point in the context of college admissions. In their model, an admissions office that cares about diversity responds to a ban on race-based admissions by using a noisy admissions test that does not select the best candidates from either the majority or minority group. As a result, a ban on affirmative action intended to raise student

quality may backfire and lower it instead. In that paper, the admissions office's preferences are exogenous, whereas in this paper they arise endogenously from distributional politics. This paper differs from the literature in that it explicitly models the policy-making process and explains why apparently inefficient policies may be chosen in equilibrium. Significantly, it shows that a policy may be chosen for its "unintended consequences"—voters ban affirmative action precisely because they expect the college to circumvent the ban by using a nosier test.

This paper uses a model of admissions where a limited number college seats are rationed via an admissions test. A couple of recent papers rationalize these features. Fernandez (1998) assumes there is a limited number of high-quality schools and shows that under borrowing constraints admissions exams perform better than markets in assigning better students to better schools. De Fraja (2001) shows that when the marginal production cost of college education increases in the size of the student body, high-ability voters may vote to implement an ability test to reject low-ability students. In his model, ability tests equalize educational opportunities between high- and low-income voters but create ambiguous efficiency effects—the resulting class contains more high-ability students, but its size is inefficiently small.

Blair and Crawford (1984) analyze the voting equilibrium of a monopoly labor union that faces a trade-off between wages and employment. They show that under a strict seniority rule, if the distribution of employment shocks has an increasing hazard rate, then senior members prefer higher wages (and less employment) than junior members. The logic behind their result is much like that behind our result that higher types prefer more affirmative action than lower types.

Finally, our empirical results are related a small empirical literature on the determinants of attitudes toward affirmative action, which we discuss in Section 5.

2 A Model

An economy is composed of citizens from two ethnic groups: a majority group, W, and a minority group, N. The sole good in the economy, college education, is supplied by a college with a fixed capacity of $C < W + N$ students. Education costs nothing to produce, and the college charges no tuition. Instead, it rations education according to some admissions rule.

The majority group is divided into three socioeconomic types, $I \equiv \{l, m, h\}$, which we refer to as low, middle, and high types, respectively. We use the order $l < m < h$. The size of the majority group is W, and the size of type i is W_i. Each citizen of type i is endowed with the same income λ_i. Throughout, we assume that $0 < \lambda_l \leq \lambda_m \leq \lambda_h$ and that λ_m is the median income. The minority

group has size N, and all minority citizens have the same income $0 \leq \lambda_N < \lambda_l$, the income of low types. To capture the strong empirical correlation between standardized-test scores and parental income and education levels, we equate income and ability and denote both by λ. This correlation may arise because higher-income parents invest more in developing their children's human capital, but its origins do not matter for our purposes. Due to their lower income, minority citizens have lower academic ability than majority citizens.[9] Because the economy consists of only a single good, income only operates through its effect on ability.

2.1 Citizens

Every citizen applies to the college and matriculates if admitted. Since minority citizens play no active role in our model, we simply assume that they receive some fixed positive utility from attending college. We normalize the utility of a majority citizen not attending college to zero. Those majority citizens who attend college benefit from a diverse student body.[10] We capture this by assuming that a majority citizen admitted to college always prefers more minority classmates. Henceforth we use the term "diversity" to mean minority enrollment. The higher diversity, the lower a majority citizen's *ex ante* probability of admission, all else equal. Let n denote the fraction of the student body composed of minority citizens, $\pi(n, \lambda)$ denote the probability that a majority citizen with ability λ is admitted when diversity is n, and $f(n, \lambda)$ denote the value of education to a majority citizen of type λ when diversity is n. The expected utility of a majority citizen is $\pi(n, \lambda) f(n, \lambda)$. A majority citizen's willingness to pay for n measured in terms of probability of admission is thus $\frac{\partial f}{\partial n} \frac{\pi}{f}$. If $\frac{\partial f}{\partial n} \frac{1}{f}$ increases in λ, then higher types have a stronger preference for diversity than lower types. For the rest of the paper, we assume that preferences are "income neutral"—for each n and λ, $f(n, \lambda) = v(n)$, for some v such that $v'(n) > 0$, $v''(n) \leq 0$, and $v(0) = 0$.[11] Since all majority citizens have the same intrinsic preferences over diversity, they behave differently only because the admissions process presents them with different constraints.

In our model, majority citizens value diversity only when they are admitted. In reality, out of a concern for social justice or for other ideological reasons they may also value it when not admitted.

[9] Our qualitative results would not change if $\lambda_N > \lambda_l$, so long as λ_N is less than the mean majority income. We use the stronger assumption solely to simplify our analysis.

[10] Many college graduates believe that an ethnically diverse student body contributed to the value of their educations. For example, Bowen and Bok (1998) report a survey of recent alumni from elite colleges and universitites in which fifty-five percent of whites consider the "ability to work effectively and get along well with people of different races/culture" to be a "very important" life skill; sixty-three percent of whites believe that their undergraduate experience was of considerable value in developing this skill.

[11] It is easy to show that f'/f is constant in λ if and only if $f(n, \lambda) = v(n)u(\lambda) + k$ for some functions u and v and some constant k. The normalizations $k = 0$ and $u(\lambda) = 1$ for all λ do not affect any of our results.

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As long as any such concern is small relative to the direct effect that diversity has on education, our qualitative results are robust. We return to this issue in the conclusion.

2.2 Admissions Rules

An admissions rule consists of an admissions test and cutoff scores for the majority and the minority groups, denoted by t_W and t_N, respectively. It admits any citizen who scores above her group's cutoff. The set of feasible admissions tests is denoted by the extended ray $[\underline{x}, \infty]$ for $\underline{x} > 0$. A feasible admissions rule is characterized by an admissions test $x \in [\underline{x}, \infty]$ and a pair of cutoffs (t_W, t_N) that satisfy the capacity constraint—the number citizens admitted equals C. On test x, a citizen with ability λ scores $t = \lambda + x\varepsilon$, where ε is random term with zero mean and finite variance. One test x is more accurate than another x' if $x < x'$, and so $\underline{x}$ is an upper bound on the accuracy of feasible tests. Let ϕ and Φ be the density and distribution functions of ε, respectively. We assume ϕ is everywhere strictly positive on $\mathbf{R}$, twice differentiable, and satisfies the following assumption.

Assumption 1 *ϕ is strictly log-concave.*

Formally, Assumption 1 is equivalent to the strict monotone likelihood ratio property (SMLRP): for any $y > z$, $\phi\left(\frac{t-y}{x}\right)/\phi\left(\frac{t-z}{x}\right)$ strictly increases in t—the higher the test score, the greater the likelihood that it comes from a higher-ability citizen. This in turn implies that on any test x the expected ability of citizens scoring t strictly increases in t, a natural property of any meaningful test. For instance, if a test contains multiple questions, and higher-ability citizens answer each question correctly with higher probability, then test score satisfies Assumption 1. Many common distributions, including the normal and the logistic, have strictly log-concave densities.[12]

The parameter x may be interpreted as an exogenous characteristic of a test or as noise deliberately added to existing measures of qualification. For example, subject tests (e.g., the SAT II, the British GCSEs or A levels) are better measures of academic knowledge than aptitude tests (e.g., the SAT I), and standardized tests may be less random than high-school grades (since different schools use different standards). College admissions policies also take into account such non-academic factors as "character" or "leadership," in which case x may be viewed as the weight given to these factors relative to academic achievement. Schools sometimes explicitly add noise: the University of California at Berkeley's law school does not use a candidate's exact law-school admissions test score (LSAT), but rather it has partitioned the range of LSAT scores into intervals and only considers the interval that contains the candidate's score.

[12] For more on log concavity, see Bagnoli and Bergstrom (1989).

When $t_N = t_W$, citizens from the two groups are treated identically. When $t_N < t_W$, there is affirmative action. While in reality it may be illegal to set $t_W < t_N$, here for simplicity we ignore this constraint. Under the admissions rule (x, t_N, t_W), the fraction of the class belonging to the majority group is

$$1 - n = \frac{\sum_{i \in I} \left(1 - \Phi\left(\frac{t_W - \lambda_i}{x}\right)\right) W_i}{C} \tag{1}$$

and the fraction belonging to the minority group is

$$n = \frac{\left(1 - \Phi\left(\frac{t_N - \lambda_N}{x}\right)\right) N}{C}. \tag{2}$$

It is clear from Equations 1 and 2 that for any x, any $n \in (0, 1)$ is achievable by choosing the right t_W and t_N. Henceforth, we represent an affirmative-action admissions rule by the duple $(x, n) \in [\underline{x}, \infty] \times (0, 1)$. Equations 1 and 2 show how x and n determine the cutoffs $t_W(x, n)$ and $t_N(x, n)$.

As $\underline{x} > 0$, on any test some higher-ability citizens are rejected in favor of lower-ability ones, but for any finite x higher-ability citizens have a higher probability of admission than lower-ability citizens. Because minority citizens have lower income than majority citizens, when $t_N = t_W$ they are underrepresented, i.e. $n < \frac{N}{N+W}$. One way to admit more minority citizens is by using affirmative action—setting $t_W > t_N$. Another is by making the test less accurate—setting $x > \underline{x}$. As minority citizens have lower academic ability, increasing noise increases their representation. When $x = \infty$, $n = \frac{N}{N+W}$. While both affirmative action and randomization can achieve any $n \leq \frac{N}{N+W}$ (so long as n is no smaller than it would be without affirmative action on test $\underline{x}$), they do so by rejecting different majority citizens. This leads different types of majority citizens to have different preferences over admissions rules.

3 Preferences over Admissions Rules

Section 4 models how majority citizens determine the admissions rule before learning their test scores.[13] In this section, we first analyze their preferences over admissions rules.

Under admissions rule (x, n) a majority citizen from group i receives an expected utility

$$U_i(x, n) = \left(1 - \Phi\left(\frac{t_W(x, n) - \lambda_i}{x}\right)\right) v(n). \tag{3}$$

[13] Incorporating minority citizens into the political process would not change our qualitative results but would slightly complicate analysis.

When income is evenly distributed ($\lambda_l = \lambda_m = \lambda_h$), every majority citizen has the same chance of admission, in which case her expected utility can be written as

$$U_i(x,n) = \frac{(1-n)\,C}{\sum_{i\in I} W_i} v(n). \tag{4}$$

Since the expression in (4) does not depend on x, majority citizens are indifferent over admissions tests under equal income distribution; furthermore, their preferred n is independent of C and λ_i. When income is unevenly distributed, majority citizens from different income groups no longer have the same preference over affirmative action. Let $\phi_i(x,n) \equiv \phi\left(\frac{t_W-\lambda_i}{x}\right)$ and $\Phi_i(x,n) \equiv \Phi\left(\frac{t_W-\lambda_i}{x}\right)$. Using equation 1, the marginal utility of n (taking into account its effect on the probability of admission) for a citizen of type i can be written as

$$\frac{\partial U_i}{\partial n} = \frac{-\phi_i(x,n)\,C}{\sum_{j\in I}\phi_j(x,n)\,W_j} v(n) + (1-\Phi_i(x,n))\,v'(n). \tag{5}$$

Increasing diversity raises the citizen's value of education when she is admitted. But it also entails increasing the cutoff t_W, thereby rejecting majority citizens scoring at t_W. Hence, a citizen's preference for diversity depends both upon her probability of admission—the probability that she scores above t_W—and the probability that she scores at the cutoff t_W.

Lemma 1 *Under Assumption 1, for each x, n, and $i > j$, $\frac{\phi_i(x,n)}{1-\Phi_i(x,n)} < \frac{\phi_j(x,n)}{1-\Phi_j(x,n)}$ (Theorem 2, Bagnoli and Bergstrom 1989).*

Lemma 1 states that high types have lower hazard rates than middle types than low types. It follows from the fact that Φ is log-concave when ϕ is log-concave. As a result, high types place relatively more weight on the positive effect that diversity has on the value of education and less weight on the negative effect that diversity has on their chance of admission. Let $n_i^*(x)$ denote type i's preferred level of diversity with admission test x.

Proposition 1 *Given Assumption 1, for each $x \in [\underline{x}, \infty)$, $n' > n$ and $j > i$, if $U_i(x,n') \geq U_i(x,n)$ then $U_j(x,n') > U_j(x,n)$. Thus, $n_h^*(x) \geq n_m^*(x) \geq n_l^*(x)$, and $n_m^*(x)$ is the Condorcet winner among all n given x.*[14]

Proposition 1 follows immediately from Lemma 1. It says that for any test x, majority citizens' preferences over n satisfy a single-crossing property: whenever low types want to admit more minority citizens, so too do high types. The single-crossing condition implies that low and middle

[14] Alternative x from the set X is a Condorcet winner if a majority of citizens prefers x to any $x' \in X$.

types prefer $n_m^*(x)$ to any $n > n_m^*(x)$, and middle and high types prefer $n_m^*(x)$ to any $n < n_m^*(x)$. Since λ_m is the median income, $n_m^*(x)$ is a Condorcet winner.[15]

3.1 Admissions Tests

Majority citizens' income affects not only their preferences over diversity but also their preferences over the means of achieving diversity. Recall that minority citizens can be admitted either by using affirmative action—setting $t_N < t_W$—or by adding noise to the admissions test—setting $x > \underline{x}$.

Proposition 2 *For each n, $j > i$, and $x' > x$, if $U_j(x', n) \geq U_j(x, n)$ then $U_i(x', n) > U_i(x, n)$. Furthermore, $\frac{\partial U_i}{\partial x} \geq 0$ if and only if $E[\lambda | t_W, x] \geq \lambda_i$, and $\frac{\partial U_i}{\partial x} = 0$ if and only if $E[\lambda | t_W, x] = \lambda_i$.*

For any given n, majority citizens' preferences over x satisfy a single-crossing property: if high types prefer a more random test, then so too do low types. Specifically, a majority citizen benefits from a more random test if and only if her income is below the average income of majority citizens scoring at the cutoff. Fixing n, the marginal value of x to a citizen of type i is

$$\frac{\partial U_i}{\partial x} = -\frac{\phi_i(x,n)}{x}\left(\frac{\partial t_W(x,n)}{\partial x} - \frac{t_W(x,n) - \lambda_i}{x}\right) v(n).$$

A more random test $x + dx$ affects both the citizen's test score and the cutoff. Since t_W is continuous in x, a small increase in noise only matters to those citizens scoring near the original cutoff $t_W(x, n)$. A citizen with ability λ_i scores t_W under (x, n) only when $\varepsilon = \frac{t_W - \lambda_i}{x}$. Under the new test $x + dx$ her score changes by $\frac{t_W - \lambda_i}{x} dx$. To satisfy the capacity constraint, the cutoff must adjust by an amount equal to the average change in test score among citizens scoring t_W. Thus,

$$\frac{\partial t_W}{\partial x} = \frac{t_W - E[\lambda | t_W, x]}{x},$$

where $E[\lambda | t_W, x] \equiv \frac{\sum_{i \in I} \phi_i(x,n) W_i \lambda_i}{\sum_{i \in I} \phi_i(x,n) W_i}$, the expected ability of a majority candidate scoring at the cutoff t_W. Hence, type i is better off under $(x + dx, n)$ than under (x, n) when $\frac{t_W - \lambda_i}{x} > \frac{t_W - E[\lambda | t_W, x]}{x}$. Cancelling common terms yields the second part of Proposition 2. A slight increase in x only affects citizens scoring at t_W. But if a lower-ability citizen has the same test score as a higher-ability citizen, then the lower-ability citizen must have a larger random term ε, in which case increasing x leads to the lower-ability citizen scoring higher than the higher-ability citizen.

Let $x_i^*(n)$ denote type i's preferred test given diversity level n. Whatever x and n, $\lambda_h > E[\lambda | t_W, x] > \lambda_l$, so for each n, $x_h^*(n) = \underline{x}$ and $x_l^*(n) = \infty$: high types want as little noise as

[15] See Gans and Smart (1996) for more on this type of single-crossing condition—first used by Roberts (1977) to model voting over income tax schedules—and the existence of Condorcet winners.

possible while low types want as much. If on each test λ_m exceeds the mean ability at the cutoff, then increasing x always lowers middle types' utility, and hence they prefer test $\underline{x}$. Likewise, if on each test λ_m falls short of the mean ability at the cutoff, then middle types prefer $x = \infty$. But in intermediate cases, middle types may prefer a test different from either low or high types. If $E[\lambda] = E[\lambda | t_W, \infty] < \lambda_m$, then middle types prefer $x < \infty$. If $\lambda_m < E[\lambda | t_W, \underline{x}]$, then they prefer $x > \underline{x}$. If both conditions hold, then middle types favor some noise, but not infinitely much.

Propositions 1 and 2 are closely related. High types like diversity more than low and middle types because conditional on scoring above t_W, they are less likely to score at t_W. For the same reason, affirmative action is their preferred means of achieving diversity: affirmative action displaces majority citizens scoring at the cutoff, while randomization rejects some majority citizens scoring above the cutoff as well. Low types have opposite preferences. Middle types have preferences somewhere in between: they may want a test that is accurate enough to reject low types, but not so accurate as to admit only high types.

3.2 Income Inequality

High types prefer more diversity than middle and low types—as expressed in Proposition 1—both due to income inequality and the admissions technology. We saw that when income is evenly distributed, every majority citizen prefers the same level of diversity, n^*, that maximizes (4). But even when income is unevenly distributed, all majority citizens would prefer n^* under any admissions system allocating the $(1-n)C$ majority seats to the three types of majority citizens in fixed proportion.[16] In fact, n^* is the unique Pareto-efficient diversity level when admissions are unconstrained by test scores. Let $\omega_i(x,n) \equiv (1-\Phi_i(x,n))W_i / \sum_{i \in I}(1-\Phi_i(x,n))W_i$, the share of the majority citizens admitted under admissions rule (x,n) from majority type i. Any admission rule (x,n), where $n \neq n^*$, can be improved upon for each type i by having each type forego $(n^*-n)C\omega_i(x,n)$ seats in order to produce diversity n^* rather than n.[17] But when admissions is based solely on test scores, such a reallocation is infeasible: high types bear too small a share of the cost of increasing diversity.

[16] If n^* maximizes $(1-n)v(n)$, then it maximizes $d(1-n)v(n)$ for any constant d.

[17] This follows from

$$U_i(x,n) = \frac{\omega_i(x,n)(1-n)Cv(n)}{W_i} < \frac{\omega_i(x,n)(1-n^*)Cv(n^*)}{W_i} = \frac{\omega_i(x,n)C((1-n)-(n^*-n))}{W_i} v(n^*).$$

In our model, type i's preferred level of diversity, n_i^*, satisfies the condition

$$\frac{h_i(x, n_i^*)}{\sum_{j \in I} h_j(x, n_i^*)\omega_j(x, n_i^*)} = (1 - n_i^*)\frac{v'(n_i^*)}{v(n_i^*)}, \tag{6}$$

where $h_i(x, n_i^*) \equiv \phi_i(x, n_i^*) / (1 - \Phi_i(x, n_i^*))$ is type i's hazard rate, and $\sum_{j \in I} h_j(x, n_i^*)\omega_j(x, n_i^*)$ is the average hazard rate of the admitted class.[18] By definition, $(1 - n^*)\frac{v'(n^*)}{v(n^*)} = 1$. Since $(1 - n)\frac{v'(n)}{v(n)}$ decreases in n, for any x, $n_i^*(x) \geq n^*$ if and only at the cutoff if type i's hazard rate is less than a weighted average of all three types' hazard rates, where each type's hazard rate is weighted by its share of admitted majority citizens. Since for each x and n, $h_l(x, n) > h_m(x, n) > h_h(x, n)$, for each x, $n_h^*(x) > n^*$ and $n_l^*(x) < n^*$. Increasing diversity has the ancillary effect of decreasing the share of the cost of diversity borne by high types and increasing that borne by low types. As a result, high types prefer more diversity than the Pareto-efficient level n^*, while low types prefer less.

Proposition 3 *If ϕ is single peaked, then there exists $\overline{C}$ such that for each $C < \overline{C}$, $x \in [\underline{x}, \infty)$, and $i \in \{l, m\}$, $n_i^*(x; C, (\lambda_i)_{i \in I}) < n_i^*(x; C, (\lambda_i')_{i \in I})$ if $\sum_{i \in I} \lambda_i W_i = \sum_{i \in I} \lambda_i' W_i$, where $\lambda_h > \lambda_h'$, $\lambda_m \leq \lambda_m'$ and $\lambda_l \leq \lambda_l'$.*

When admissions are sufficiently selective, redistributing income away from either low or middle types to high types causes both low and middle types prefer less diversity. It follows that for each x, $n_m^*(x) < n^*$ when $\lambda_m < \sum_{i \in I} \lambda_i W_i / \sum_{i \in I} W_i$. Thus, the median majority voter prefers diversity lower than n^* when the majority group's median income is below its mean.

The condition that ϕ is single peaked is weak and satisfied, for example, by a test consisting of many independent questions. In reality, SAT I and other standardized-test scores are single peaked. Furthermore, C need not be extremely small for the proposition to hold. For example, for a symmetric ϕ, it suffices that $C < \frac{W_h}{2}$. The crux of the proposition is that redistributing from low to high types lowers middle types' demand for diversity. Equation (6) expresses middle types' demand for diversity in terms of their competitive position compared to that of the entire admitted class. Redistributing income from low to high types raises the high types' share of the admitted class. Since high types are in a better competitive position than low types, redistribution worsens middle types' relative competitive position and therefore lowers their demand for diversity.

In sum, income inequality coupled with testing constraints prevents majority citizens from choosing n^*, the Pareto-efficient level of diversity. At elite colleges with highly selective admissions

[18] Equation 6 follows from substituting Equation 1 into Equation 5.

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policies, low and middle types demand too little diversity. Yet implementing n^* would not require a drastic redistribution of income. Starting from any admission rule (x, n), to implement n^* it suffices to reduce the cutoffs for middle and low types such that the three majority types give up seats in proportion their shares of majority citizens' seats under (x, n). Hence, a Pareto-efficient admissions policy should consider both candidates' race and socioeconomic background. Since minority candidates are more likely than majority candidates to belong to lower socioeconomic groups, many commentators have suggested using class-based affirmative action—lower standards for applicants from lower socioeconomic groups—as a substitute for race-based affirmative action. By contrast, our model suggests that because class-based affirmative action raises low and middle types' demand for diversity, it may complement race-based affirmative action.

3.3 Demand for Diversity

Equation 6 expresses type i's demand for diversity in terms of her competitive position at the cutoff in relation to those of the other types. This of course depends on the admissions test. For $x = \infty$, the three majority types are represented in proportion to their shares of all majority citizens, and hence each type is in the same position at the cutoff and demands n^*. To illustrate the three types' preferred diversity levels under different admissions tests, we calibrate an example of our model using the following parameters: for each $i \in I$, $W_i = 1$, $C = 0.5$, $\varepsilon \sim N(0, 1)$, $\lambda_h = 0.8$, $\lambda_m = 0.7$, $\lambda_l = 0$ and $v(n) = n^{0.2}$.

[Insert Figure 1 about here.]

Figure 1 shows the three types of majority citizens' demand for diversity as a function of x. The baseline corresponds to all majority citizens having equal income, or $x = \infty$; that is, it denotes n^*. Starting from the right of the figure (large x), increasing the accuracy of the test improves the competitive position of high types and worsens that of low types. As a result, high types prefer more diversity and low types prefer less. As x grows smaller, low types continue to demand less diversity, but high and middle types first demand more and then less.

Figure 1 illustrates that middle and high types' demand for diversity is not monotone in x. For small x—a precise admissions test—high types comprise nearly all admitted majority citizens, which means that they reap all the benefits of diversity but also bear all of its costs. As we have seen, this implies that they demand n close to n^*. As x increases, more low and middle types are admitted, and high types benefit less from diversity but also pay a smaller part of the costs. For small x, an increase in x raises the share of low and middle types scoring at the cutoff more than

the share scoring above the cutoff. Thus, increases in x reduce high types' share of the costs of diversity faster than their share of the benefits. As a result, when x is small, increasing x increases high types' demand for diversity.

4 Banning Affirmative Action

Admissions policies at elite American state colleges and universities are determined jointly by the public and the schools themselves. The public cannot directly dictate admissions policies but instead can impose certain restrictions, for instance by banning affirmative action, through ballot referenda or legal action. Subject to these limitations, colleges are free to choose their own admissions policies. If voters dislike a college's admissions policies under affirmative action, then they may ban affirmative action in order to force the college to change its policies. Like their preferences over diversity and admissions tests, voters' preferences over banning affirmative action depend upon their competitive positions in admission. In this section, we show that a majority voter may vote to ban affirmative action solely to improve her own chance of admissions. Hence, a ban may not be about diversity at all.

We model the political process as a two-stage game. In the first stage, citizens from the majority group decide whether to ban affirmative action by way of majority voting. In the second stage, the college chooses an admissions rule that complies with the public's affirmative-action policy. As many of the administrators and faculty members who run elite colleges are themselves graduates of these institutions, we expect them to have preferences closer to those of the alumni, many of whom belong to high socioeconomic groups, than to those of the public at large. For simplicity, we assume the college is governed by high types. The assumption is consistent with the fact that elite colleges and universities support affirmative action to a greater extent than the public at large.[19] Our qualitative results would not change if we modeled the college as being governed by administrators with preferences between those of middle and high types.

We begin by analyzing high types' problem of designing an optimal admissions rule given the public's affirmative-action policy. Suppose the public does not ban affirmative action. From Section 3, high types set $x = \underline{x}$ and $n_h^*(\underline{x}) > n^*$, the Pareto-efficient diversity level defined in Section 3. Since high types do not bear the cost of diversity, they choose too much of it from a social perspective. While $n_h^*(\underline{x})$ is Pareto inefficient *absent the constraints of the testing technology*, it is efficient given

[19] For evidence that elite colleges and universities support affirmative action, see the statements by the American Council on Education [1998] and the Association of American Universities [1997] at <www.umich.edu/~newsinfo/Admission/admiss.html>.

these constraints: high types cannot be made better off under any feasible admissions rule.

When affirmative action is banned, the college can no longer choose x and n independently. In this case, x constitutes its only means of achieving diversity. For each noise level x, define $\widetilde{n}(x)$ such that

$$t_N(x, \widetilde{n}(x)) = t_W(x, \widetilde{n}(x)). \tag{7}$$

When the same threshold is applied on test x to both minority and majority citizens, $\widetilde{n}(x)$ is the fraction of class drawn from the minority group. Recall that $t_W(x,n)$ and $t_N(x,n)$ are defined implicitly by Equations 1 and 2, respectively. Differentiating Equation 2 and the capacity constraint (Equation 1 plus Equation 2) with respect to x yields

$$\frac{d\widetilde{n}}{dx} = \phi\left(\frac{t_{NW}(x) - \lambda_N}{x}\right)\frac{N}{C}\frac{E_{NW}[\lambda | t_{NW}, x] - \lambda_N}{x^2}, \tag{8}$$

where $t_{NW}(x) \equiv t_N(x, \widetilde{n}(x)) = t_W(x, \widetilde{n}(x))$ is the common threshold under admissions test x, and $E_{NW}[\lambda | t_{NW}(x)]$ is the average ability of majority and minority citizens scoring t_{NW}. Since $\lambda_N < \lambda_l$, $E_{NW}[\lambda | t_{NW}, x] > \lambda_N$. Hence, $\frac{d\widetilde{n}(x)}{dx} > 0$ for each x.

Under a ban, high types choose x to maximize

$$U_h(x, \widetilde{n}(x)) = \left[1 - \Phi\left(\frac{t_{NW}(x) - \lambda_h}{x}\right)\right] v(\widetilde{n}(x)),$$

and their marginal utility with respect to x is equal to

$$\frac{dU_h}{dx} = \frac{\partial U_h(x, \widetilde{n}(x))}{\partial x} + \frac{\partial U_h(x, \widetilde{n}(x))}{\partial n}\frac{d\widetilde{n}(x)}{dx}.$$

The first term is the direct effect of increasing x on high types analyzed in Section 3 and is always negative. The second term is the indirect effect that x has on U_h through diversity. High types choose $x > \underline{x}$ under a ban if $\frac{dU_h(\underline{x}, \widetilde{n}(\underline{x}))}{dx} > 0$. Let x_b denote the optimal test for the college under a ban. Since under a ban high types must give up a larger number of seats in the entering class for each unit increase of n, $\widetilde{n}(x_b) < n_h^*(x_b)$, the diversity level high types would choose given test x_b if they could use affirmative action. If $n_h^*(x)$ were everywhere decreasing in x, then since $x_b > \underline{x}$ we could conclude that banning affirmative action leads to a fall in diversity. However, this is not the case. As we saw in Section 3, $n_h^*(x)$ may increase in x. Hence, we cannot rule out in principle the possibility that banning affirmative action may actually *improve* diversity.

Since high types never vote for a ban, a ban is passed in the first stage if and only if both low and middle types like $(\underline{x}, \widetilde{n}(\underline{x}))$ better than $(x_b, \widetilde{n}(x_b))$. Given $\underline{x}$, low and middle types prefer less diversity than $\widetilde{n}(\underline{x})$, and they may ban affirmative action if $\widetilde{n}(x_b)$ is less than $\widetilde{n}(\underline{x})$. But reducing

diversity is not the only reason for a ban. Since raising x is the only way to increase diversity under a ban, low and middle types who prefer a noisy test may also use a ban as an instrument to force high types to choose a higher x. The following two propositions describe several scenarios where this may happen.

Proposition 4 *Suppose that $C < W_h$. Then for each $(\lambda_l)_{l \in I \cup \{N\}}$ there exists $\widehat{x} > 0$ such that if $\underline{x} < \widehat{x}$, then affirmative action is banned. Likewise, for each $\underline{x}$, there exists some $k > 0$ such that if $\lambda_h - \lambda_m > k$, then affirmative action is banned.*

Proposition 5 *Suppose that $\lim_{\varepsilon \to \infty} \frac{d \log \phi(\varepsilon)}{d\varepsilon} = -\infty$. Then for each $(\lambda_l)_{l \in I \cup \{N\}}$ and x there exists some $\widehat{C} > 0$ such that if $C < \widehat{C}$, affirmative action is banned.*

Proposition 4 considers the case where high types' income is much higher than that of low and middle types, or where the test $\underline{x}$ is highly accurate. Proposition 5 considers the case where the power of the test is unbounded for high test scores—the condition on the density ϕ (its right tail is "sub-log linear") ensures that for each x, as t approaches infinity, the likelihood ratios $\phi\left(\frac{t-\lambda_h}{x}\right) / \phi\left(\frac{t-\lambda_m}{x}\right)$ and $\phi\left(\frac{t-\lambda_m}{x}\right) / \phi\left(\frac{t-\lambda_l}{x}\right)$ also approach infinity.[20] In all three cases, under affirmative action high types choose $x = \underline{x}$, and, hence, the fraction of admitted majority candidates from low or middle types goes to zero in the limit. By contrast, under a ban when high types must use x in order to achieve diversity, the fraction of admitted majority citizens belonging to middle and low types stays bounded above zero.

In the situations described by Propositions 4 and 5 low and middle types ban affirmative action not to achieve their preferred level of diversity—given the test $\underline{x}$, their chances of admission are virtually nil whatever n—but in order to force high types to choose a higher x. Corollary 1 emphasizes this point.

Corollary 1 *Suppose that if affirmative action is not banned, then the college chooses x and simultaneously majority citizens vote on n. Then Propositions 4 and 5 continue to hold.*

Chan and Eyster (2001) argue that a ban on affirmative action intended to improve admitted candidates' qualifications may be self-defeating because schools can counteract it by changing their admissions standards. But Corollary 1 suggests that voters may ban affirmative action precisely because it leads to changes in admissions standards. It explains why voters opposed to affirmative

[20] This condition is satisfied by many common distributions, including the normal. For more on it, see Barndorff-Nielsen and Shephard (2002, Chapter 1).

action may support a race-blind admissions policy that maintains diversity by admitting candidates based on high-school rankings alone.

Finally, as banning affirmative action introduces an extra constraint on the ways majority citizens can divide the costs of diversity, it may lead to admissions policies that are constrained Pareto inefficient. For example, consider any equilibrium where low and middle types ban affirmative action in the first stage and high types choose $x > \underline{x}$ in the second stage. By definition, $\frac{dU_h(x_b,\tilde{n}(x_b))}{dx} = 0$ and $\frac{\partial U_h(x_b,\tilde{n}(x_b))}{\partial n} > 0$. If both middle and low types strictly prefer $x > x_b$ under a ban, namely $\frac{dU_i(x_b,\tilde{n}(x_b))}{dx} > 0$ for $i \in \{l, m\}$, then all three types can be made better off by first increasing x holding $t_N = t_W$ and then increasing n holding x constant.[21] This Pareto inefficiency constitutes an example of "political failure" in the sense of Besley and Coate (1997). As they point out, this sort of inefficiency may arise when candidates have heterogeneous policy-making abilities. In our model, it arises because high types, who choose the admissions rule, do not have the same preferences as the median voter, who chooses whether to ban affirmative action.

5 Empirical Analysis

To test our model's prediction that people's preferences for affirmative action depend upon their competitive position in admissions, we examine data from a CBS News/New York Times opinion poll comprised of telephone interviews with 1258 randomly-selected adults throughout the United States in December 1997. Unlike other opinion polls that contain only general questions on affirmative action in admissions or employment—where our model makes no predictions—this poll includes several questions that refer specifically to race-based college admissions policies or minority-outreach programs.

The entire poll contains forty-one questions on racial inequality, discrimination, and affirmative action. We analyze those questions presented in the most precise and neutral manner; they are listed in Table 1. Questions (Q) 19, 34, and 42 refer exclusively to college admissions, while Q44 and Q50 deal with college admissions as well as workplace hiring and promotion decisions. We analyze Q19, which asks whether racial diversity is an important *objective*, and Q34, which asks whether affirmative action—choosing a black candidate over an equally qualified white candidate—is an appropriate *means* of achieving diversity.[22] We focus on the 806 non-Hispanic white respondents

[21] Formally, there exists $\alpha > 0$, such that for each $i \in I$, $\frac{dU_i(x,\tilde{n}(x))}{dx} + \alpha\frac{\partial U_i(x,\tilde{n}(x))}{\partial n} > 0$.

[22] An advantage of Q34 is that it eschews the term "affirmative action," which may mean different things to different people: some may interpret it as a system of racial quotas; some may think it applies to women as well. It may also provoke political reactions that Q34 does not. Democrats may know that their party supports affirmative action, without knowing exactly what that entails. Thus they might support "affirmative action" without favoring

aged 25 or above. The overall pattern of responses depicted in Table 1 is consistent with other opinion polls. A large majority of whites consider diversity either somewhat or very important, yet only a minority agree that a black candidate should be selected over a equally qualified white in order to diversify the student body. On the other hand, a majority supports programs that help minority students compete for college admissions as well as preferences for the poor in admissions and hiring decisions. (This of course does not mean that a majority of respondents favor replacing affirmative action with special education programs sufficiently extensive to maintain current minority enrollment.)

[Table 1 about here.]

We proxy for respondents' competitive position in admissions (their socioeconomic status) using educational attainment. We use education rather than self-reported family income because it is more reliable. Nevertheless, our basic conclusions would still hold if we used income in place of education, although our estimates would be less robust. Respondents' education levels are divided into five categories: below high school, high-school graduate, some college, college graduate, and post-graduate. Because of the small sample size, we merge high-school graduate with some college and college graduate with post-graduate to create three groups: "below high school," "high school plus," and "college plus." We limit our sample to those aged 25 or above because current educational attainment may not reliably measure younger respondents' socioeconomic status.

To test our theoretical model we use binary logit to compare responses to Q34 for the three education groups. The first three columns of Table 2 are based on a sample of non-Hispanic whites aged 25 or above. Column 1 includes only the two education dummies as independent variables. The coefficients are ordered as our model predicts—higher socioeconomic groups favor affirmative action more than lower ones—but only the coefficient on college plus is significant. Column 2 controls for personal characteristics including age, sex, geographical location, and the presence of young children in the household. Doing this does not affect the significance of the coefficient on college plus. Column 3 adds respondents' own responses to Q19, which captures their inherent preferences for diversity in college admissions. Not surprisingly, these responses are highly significant and the estimated coefficients are ordered in the natural way, with those who believe diversity more important more likely to support race-based admissions. Once responses to Q19 are included, none of the personal characteristics have significant coefficients. In particular, age seems to influence

preferences for minority candidates (and *vice versa* for Republicans). Indeed, 83 percent of Republicans and 72 percents of Democrats state that race should not matter in Q34, whereas 81 percent of Republicans and only 47 percent of Democrats favor ending all affirmative-action programs (Q39). For all of these reasons, we believe that Q34 captures people's attitudes towards race-based admissions better than the other questions.

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attitudes towards race-based admissions only insofar as it influences preferences for diversity: older people care less about diversity. The college-plus dummies in all three regressions have the correct sign and are statistically significant; the high-school-plus dummies also have the correct sign and magnitude, but are not statistically significant. The effect of education is large: college graduates are about three times as likely to support affirmative action as those without a high-school degree. Figure 2 depicts the predicted probabilities of choosing the black student for different educational levels and attitudes toward diversity based on the logit reported in column 3.

[Table 2 about here]

[Figure 2 here]

Our results demonstrate that college graduates do not support affirmative action simply because they care more about diversity. In fact, an ordered logit with D1, D2, and D3 as dependent variables reveals that education does not significantly predict preferences for diversity. Questions 42, 44, and 50 provide further evidence that self interest determines respondents' attitudes at least in part. Q42 and 44 elicit attitudes towards special educational and outreach programs for minority high-school students. Like affirmative action, these programs enhance diversity, but they may not displace white candidates in the same way; whereas Q39 (the affirmative action question) makes it clear that admitting the black candidate requires rejecting the white one, Q42 and 44 do not: a college or a firm may face a soft capacity constraint such that accepting one black candidate does not entail displacing one white candidate. This difference provides another test of whether people from higher socioeconomic groups view affirmative action more favorably because they care more about diversity or because they worry less about being displaced at the margin. Q50 asks whether in admissions or hiring it is a good idea to choose a candidate from a poor family over an equally qualified candidate from a middle-class or rich family. Doing so enhances diversity because many minority students come from poor families. But at the same time, it benefits whites from poor families. In this sense, class-based affirmative action has the same effect as adding noise to the admissions test in our model. Self interest suggests that whites from poor families should be more likely to support class-based affirmative action over race-based affirmative action than whites from higher socioeconomic groups. Table 3 reports regression results for the three items. In all three cases, the education dummies are insignificant, which conforms to our theory.

[Table 3 about here.]

One interpretation of our theory is that because most adults are not directly affected by affirmative action in college admissions, they form their attitudes out of concern for their children's

welfare. According to this view, the pattern we observe in models 1 to 3 in Table 2 should be stronger among respondents with young children. We compare the responses of people between the ages of 25 and 55 who live with children under the age of 18 to those of people in the same age group not living with children under 18. The results are given in columns 4 and 5 of Table 2. The basic pattern is similar to that in columns 1-3. In each case the college-plus dummy is positive and significant: education matters for non-parents too. Respondents without college-bound children may still be influenced by the effects described by our theory because they intend to have children in the future or already have adult children. More generally, respondents' attitudes may be influenced by friends and relatives with similar socioeconomic backgrounds.

A small empirical literature compares different people's attitudes towards affirmative action (although none of these papers analyzes preferences over the different means of achieving diversity). Bobo and Kluegel (1993) use data from the 1990 General Social Survey to analyze attitudes toward race-based and income-based social programs designed to equalize opportunities or outcomes (some of which are unrelated to college admissions). They find that "education has little to no effect on support for two of the three income-targeted policies, but support for improving the standard of living for blacks increases significantly with increasing years of education." Sax and Arredondo (1999), using data drawn from the Cooperative Institutional Research Program in 1996, find that among white college freshmen, those with higher socioeconomic status are more likely to believe that "affirmative action in college admissions should be abolished." Some of the discrepancies between their results and ours may be attributed to the ambiguity of the term "affirmative action" as discussed in footnote 22. Sax and Arredondo note that the term may be interpreted to mean "quotas" or "preferential treatment to unqualified individuals," both of which carry a negative connotation. Or it may be interpreted to include women, which is consistent with the fact that women are significantly more likely than men to oppose abolishing affirmative action. It is also possible that freshmen, who have yet to go through college, value diversity differently from older adults. More research is needed to clarify these issues.

6 Conclusion

This paper models white Americans' preferences over affirmative action in college admissions using an "economic" approach (Becker, 1976, Ch.1). Rather than assume heterogeneous preferences, it shows how people who share innate preferences over diversity but differ by socioeconomic background demand different levels and means of achieving diversity. The model's predictions match

data from a CBS News/New York Times poll.

The main advantage of our approach is that it connects racial diversity to the distribution of educational opportunities across socioeconomic groups, something not done in the public debate on affirmative action. Because people's attitudes towards affirmative action reflect their competitive positions in admissions, they may ban affirmative action out of distributional concerns. This suggests that policy makers should pay attention not only to diversity but also to the method of producing it. For example, class-based affirmative action may help overcome political obstacles to racial diversity by reducing the burden on white applicants from lower socioeconomic groups.

Whatever the motivations behind them, the recent bans on affirmative action have consequences beyond racial diversity. We have already described how they brought changes in admissions policies at public universities in California and Texas. California's ban also has triggered a debate over the SAT I's accuracy in predicting college academic performance. As a result of this debate, the University of California is currently considering replacing the SAT I with achievement tests, and the College Board has announced plans to add an essay section to the SAT I. Since the University of California is the largest American public university system, and most colleges require the SAT I, these changes are likely to have significant nationwide effects on college-admissions policies as well as high-school curricula.

Throughout we have assumed that majority voters care about diversity only when admitted. For many reasons, they also might care about it when unadmitted. If so, then majority citizens would care not only about their likelihood of scoring at the cutoff conditional on admission but also their unconditional likelihood of scoring at the cutoff. As a result, high types might not prefer more diversity than middle and low types. For example, under competitive admissions that made high types more likely than middle or low types to score at the cutoff, high types might demand less diversity. Of course, if concern for diversity when admitted were sufficiently large relative to concern when unadmitted, then all of our results would go through. But even if not, an overall concern for diversity would not change the different types' preferences over admissions tests. And as Corollary 1 emphasizes, the median voter may ban affirmative action not to get a different level of diversity (be it lower or higher) but instead to get a more favorable admissions test.

7 Appendix

Proof of Lemma 1: The proof follows Bagnoli and Bergstrom (1989). For any $i > j$,

$$\begin{aligned}\frac{1-\Phi_i(x,n)}{1-\Phi_j(x,n)} &= \frac{\int_{t_W}^{\infty}\phi\left(\frac{t-\lambda_i}{x}\right)dt}{\int_{t_W}^{\infty}\phi\left(\frac{t-\lambda_j}{x}\right)dt} \\ &= \int_{t_W}^{\infty}\frac{\phi(\frac{t-\lambda_i}{x})}{\phi(\frac{t-\lambda_j}{x})}\frac{\phi\left(\frac{t-\lambda_j}{x}\right)}{\int_{t_W}^{\infty}\phi\left(\frac{t-\lambda_j}{x}\right)dt}dt \\ &> \frac{\phi_i(x,n)}{\phi_j(x,n)}.\end{aligned}$$

The right-hand side of the second equation expresses $\frac{1-\Phi_i(x,n)}{1-\Phi_j(x,n)}$ as a weighted average of $\frac{\phi\left(\frac{t-\lambda_i}{x}\right)}{\phi\left(\frac{t-\lambda_j}{x}\right)}$ for $t \in (t_W, \infty)$. The last inequality holds since Assumption 1 implies that $\frac{\phi\left(\frac{t-\lambda_i}{x}\right)}{\phi\left(\frac{t-\lambda_j}{x}\right)}$ strictly increases in t.

Proof of Proposition 1: Suppose $U_i(x,n'') \geq U_i(x,n')$ for some $n'' > n'$. Then for all $j > i$,

$$\begin{aligned}\ln U_j(x,n'') - \ln U_j(x,n') &= \int_{n'}^{n''}\left(\frac{\partial U_j(x,n)}{\partial n}\Big/ U_j(x,n)\right)dn \\ &> \int_{n'}^{n''}\left(\frac{\partial U_i(x,n)}{\partial n}\Big/ U_i(x,n)\right)dn \\ &\geq 0.\end{aligned}$$

The first inequality follows from Lemma 1. Hence, $U_j(x,n'') > U_j(x,n')$. The second part is an immediate consequence of the single-crossing property.

Proof of Proposition 2: For each n, $i > j$, and $x < x'$

$$\begin{aligned}U_i(x',n) \geq U_i(x,n) &\Leftrightarrow \frac{t_W(x',n)-\lambda_i}{x'} \leq \frac{t_W(x,n)-\lambda_i}{x} \\ &\Leftrightarrow t_W(x',n)\,x - t_W(x,n)\,x' \leq \lambda_i(x-x') \\ &\Rightarrow t_W(x',n)\,x - t_W(x,n)\,x' < \lambda_j(x-x') \\ &\Leftrightarrow U_j(x',n) > U_j(x,n).\end{aligned}$$

The proof of the second part is in the text.

Proof of Proposition 3: Let $z^* \equiv \arg\max_{z\in\mathbb{R}}\phi(z)$, $\lambda_h^* \equiv \sum_{i\in I}\lambda_i W_i / W_h$, and

$\Lambda \equiv \left\{ \left(\lambda_i'\right)_{i\in I} : \sum_{i\in I} \lambda_i' W_i = \sum_{i\in I} \lambda_i W_i \right\}$. Since $t_W(x,n;C,(\lambda_i)_{i\in I})$ decreases in C, there exists $\overline{C}$ such that $t_W(\underline{x},n;\overline{C},(\lambda_h^*,0,0)) - \lambda_h^* = \underline{x}z^*$. Since for any $\left(\lambda_i'\right)_{i\in I}$, $t_W\left(x,n;C,\left(\lambda_i'\right)_{i\in I}\right)$ increases in n and x, for all $C \in \left(0,\overline{C}\right)$, $x \in [\underline{x},\infty]$, $n \in [0,1]$, and $\left(\lambda_i'\right)_{i\in I} \in \Lambda$,

$$\phi\left(\frac{t_W - \lambda_h'}{x}\right) > \phi\left(\frac{t_W - \lambda_m'}{x}\right) > \phi\left(\frac{t_W - \lambda_l'}{x}\right).$$

High types are better represented than middle types, who in turn are better represented than low types, at t_W for each x, n, and $C \leq \overline{C}$.

A mean-preserving income redistribution from type j to high types that raises λ_h by 1 unit reduces λ_j by $\frac{W_h}{W_j}$. Hence, the effect of such a redistribution on type i's preferred diversity level is $\frac{\partial n_i^*}{\partial \lambda_h} - \frac{W_h}{W_j}\frac{\partial n_i^*}{\partial \lambda_j}$, where n_i^* satisfies

$$\frac{\partial U_i}{\partial n} = \frac{-h_i C}{\sum_{j\in I}\phi_j W_j} v(n) + v'(n) = 0,$$

for $h_i \equiv \phi_i/(1-\Phi_i)$. By the Implicit Function Theorem,

$$\frac{\partial n_i^*}{\partial \lambda_h} - \frac{W_h}{W_j}\frac{\partial n_i^*}{\partial \lambda_j} = -\left(\frac{\partial^2 U_i}{\partial n \partial \lambda_h} - \frac{W_h}{W_j}\frac{\partial^2 U_i}{\partial n \partial \lambda_j}\right) \Big/ \frac{\partial^2 U_i}{\partial n^2}.$$

Since $\frac{\partial^2 U_i}{\partial n^2} < 0$, $\frac{\partial n_i^*}{\partial \lambda_h} - \frac{\partial n_i^*}{\partial \lambda_j}\frac{W_h}{W_j}$ has the same sign as $\frac{\partial^2 U_i}{\partial n \partial \lambda_h} - \frac{W_h}{W_j}\frac{\partial^2 U_i}{\partial n \partial \lambda_j}$. Let $z_i\left(x,n;(\lambda_i)_{i\in I}\right) \equiv (t_W - \lambda_i)/x$. We can write

$$\frac{\partial^2 U_i}{\partial n \partial \lambda_h} - \frac{W_h}{W_j}\frac{\partial^2 U_i}{\partial n \partial \lambda_j} = \frac{-Cv(n)h_i}{\sum_{k\in I}\phi_k W_k}\left(\frac{dh_i}{dz_i}\frac{1}{h_i}\left(\frac{dz_i}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_i}{d\lambda_j}\right) - \frac{\sum_{k\in I}\frac{d\phi_k}{dz_k}\left(\frac{dz_k}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_k}{d\lambda_j}\right)W_k}{\sum_k \phi_k W_k}\right). \tag{A1}$$

From the capacity constraint (Equation 1), $\frac{dt_W}{d\lambda_i} = \phi_i W_i / \sum_{k\in I}\phi_k W_k$. It follows that

$$\frac{dz_h}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_h}{d\lambda_j} = \frac{1}{x}\left(\frac{\left(\phi_h - \phi_j\right)W_h}{\sum_i \phi_i W_i} - 1\right).$$

For $i,j \in \{l,m\}$,

$$\frac{dz_i}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_i}{d\lambda_j} = \begin{cases} \frac{1}{x}\left(\frac{(\phi_h - \phi_j)W_h}{\sum_{k\in I}\phi_k W_k}\right) & \text{if } i \neq j \\ \frac{1}{x}\left(\frac{(\phi_h - \phi_j)W_h}{\sum_{k\in I}\phi_k W_k} + \frac{W_h}{W_j}\right) & \text{if } i = j. \end{cases}$$

Since $\frac{dz_i}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_i}{d\lambda_j} > 0$ for $i,j \in \{l,m\}$, the first term inside the parentheses in (A1) is positive.

Since, by definition, $\sum_{k\in I}\phi_k\left(\frac{dz_k}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_k}{d\lambda_j}\right)W_k = 0$, and using $\frac{d\phi_k}{dz_k} = \frac{\phi_k'}{\phi_k}\phi_k$, the second term inside the parentheses in (A1) can be rewritten as

$$\frac{1}{x\sum_{k\in I}\phi_k W_k}\left(\left(\frac{\phi_h'}{\phi_h} - \frac{\phi_m'}{\phi_m}\right)W_h\phi_h\left(\frac{dz_h}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_h}{d\lambda_j}\right) - \left(\frac{\phi_m'}{\phi_m} - \frac{\phi_l'}{\phi_l}\right)W_l\phi_l\left(\frac{dz_l}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_l}{d\lambda_j}\right)\right) < 0.$$

The inequality holds because $\frac{\phi_h'}{\phi_h} > \frac{\phi_m'}{\phi_m} > \frac{\phi_l'}{\phi_l}$ and for $j \in \{l, m\}$, $\frac{dz_h}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_h}{d\lambda_j} < 0$ and $\frac{dz_l}{d\lambda_h} - \frac{W_h}{W_j}\frac{dz_l}{d\lambda_j} > 0$. It follows that for $i, j \in \{l, m\}$, $\frac{\partial n_i^*}{\partial \lambda_h} - \frac{W_h}{W_j}\frac{\partial n_i^*}{\partial \lambda_j} < 0$.

Consider any $(\lambda_i)_{i\in I}$ and $(\lambda_i')_{i\in I}$ such that $\sum_{i\in I}\lambda_i W_i = \sum_{i\in I}\lambda_i' W_i$, and $\lambda_h > \lambda_h'$, $\lambda_m \leq \lambda_m'$ and $\lambda_l \leq \lambda_l'$. For $\alpha \in [0,1]$, define $q_i = \lambda_i' + (\lambda_i - \lambda_i')\,\alpha$. To complete the proof, note that for $i \in \{l, m\}$,

$$\begin{aligned}
& n_i^*((\lambda_i)_{i\in I}) - n_i^*((\lambda_i')_{i\in I}) \\
= & \int_0^1 \left(\frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_h}(\lambda_h - \lambda_h') + \frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_m}(\lambda_m - \lambda_m') + \frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_l}(\lambda_l - \lambda_l') \right) d\alpha \\
= & \int_0^1 \left(\frac{W_h}{W_m}\frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_m} - \frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_h} \right) \frac{W_m}{W_h}(\lambda_m - \lambda_m')\, d\alpha \\
& + \int_0^1 \left(\frac{W_h}{W_l}\frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_l} - \frac{\partial n_i^*((q_i)_{i\in I})}{\partial q_h} \right) \frac{W_l}{W_h}(\lambda_l - \lambda_l')\, d\alpha \\
< & \ 0.
\end{aligned}$$

The second equality follows from $\sum_{i\in I}\lambda_i W_i = \sum_{i\in I}\lambda_i' W_i$.

Proof of Proposition 4: We prove the second part; the first is similar and therefore omitted. The condition $C < W_h$ implies that for any n and λ_h, $1 - \Phi\left(\frac{t_W(\underline{x}, n; \lambda_h) - \lambda_h}{\underline{x}}\right) < 1$; therefore, for any n, $\lim_{\lambda_h \to \infty} t_W(\underline{x}, n; \lambda_h) = \infty$. But then $\lim_{\lambda_h\to\infty} 1 - \Phi\left(\frac{t_W(\underline{x}, n; \lambda_h) - \lambda_m}{\underline{x}}\right) = 0$, and for any n

$$\lim_{\lambda_h\to\infty} U_m(\underline{x}, n; \lambda_h) \leq \lim_{\lambda_h\to\infty} \left(1 - \Phi\left(\frac{t_W(\underline{x}, n; \lambda_h) - \lambda_m}{\underline{x}}\right)\right) v(1) = 0,$$

so middle types' utility goes to zero under affirmative action. Let $(x_b(\lambda_h), n_b(\lambda_h))$ denote high types' preferred policy under a ban on affirmative action. It must be that $U_h(x_b, n_b; \lambda_h) \geq \frac{C}{W+N} v\left(\frac{N}{W+N}\right)$, the utility that high types would receive by setting $x = \infty$, and so

$$\frac{C}{W+N} v\left(\frac{N}{W+N}\right) \leq \left(1 - \Phi\left(\frac{t_{NW}(x_b, n_b; \lambda_h) - \lambda_h}{x_b}\right)\right) v(n_b) < v(n_b),$$

and hence n_b is bounded from below by a term strictly above zero. Now suppose by way of contradiction that $\lim_{\lambda_h\to\infty}\left(1 - \Phi\left(\frac{t_{NW}(x_b, n_b; \lambda_h) - \lambda_m}{x_b}\right)\right) = 0$. Then $\lim_{\lambda_h\to\infty}\frac{t_{NW}(x_b, n_b; \lambda_h) - \lambda_m}{x_b} = \infty$ and therefore $\lim_{\lambda_h\to\infty}\frac{t_{NW}(x_b, n_b; \lambda_h) - \lambda_N}{x_b} = \infty$, in which case

$$\lim_{\lambda_h\to\infty} n_b = \lim_{\lambda_h\to\infty} N\left(1 - \Phi\left(\frac{t_{NW}(x_b, n_b; \lambda_h) - \lambda_N}{x_b}\right)\right) = 0,$$

which contradicts n_b being bounded from below by a term above zero. Hence when affirmative action is banned there exists some $\delta > 0$ such that for each λ_h, $U_m = \left(1 - \Phi\left(\frac{t_b - \lambda_m}{x_b}\right)\right) v(n_b) > \delta$.

As a result, for large λ_h middle types prefer to ban affirmative action. The proof that low types prefer a ban is similar and hence omitted.

Proof of Proposition 5: Let $\Phi_i(\underline{x}, n; C) \equiv \Phi\left(\frac{t_W(\underline{x},n;C)-\lambda_i}{\underline{x}}\right)$. First we claim that for each $n \in (0,1]$, as $C \to 0$, $\frac{1-\Phi_m(\underline{x},n;C)}{1-\Phi_h(\underline{x},n;C)} \to 0$ under affirmative action. To see this, write

$$\frac{1-\Phi_m(\underline{x},n;C)}{1-\Phi_h(\underline{x},n;C)} = \frac{\int_{t_W(\underline{x},n;C)}^{\infty}\phi_m(\frac{t-\lambda_m}{\underline{x}})dt}{1-\Phi_h((\underline{x},n;C))} = \int_{t_W(\underline{x},n;C)}^{\infty}\frac{\phi(\frac{t-\lambda_m}{\underline{x}})}{\phi(\frac{t-\lambda_h}{\underline{x}})}\frac{\phi(\frac{t-\lambda_m}{\underline{x}})}{\int_{t_W(\underline{x},n;C)}^{\infty}\phi(\frac{t-\lambda_h}{\underline{x}})dt}dt.$$

Log concavity implies that the first term in the integrand is strictly decreasing in t; the second term integrates out to unity. Thus $\frac{1-\Phi_m(\underline{x},n;C)}{1-\Phi_h(\underline{x},n;C)} \to 0$ iff $\lim_{t\to\infty}\frac{\phi(t+k)}{\phi(t)} = 0$, or $\lim_{t\to\infty}(\log\phi(t+k) - \log\phi(t)) = -\infty$. Using the Mean Value Theorem, $\log\phi(t+k) - \log\phi(t) = k\frac{d\log\phi(s)}{ds}$ for some $s \in (t, t+k)$. Hence if $\lim_{s\to\infty}\frac{d\log\phi(s)}{ds} = -\infty$, then $\lim_{C\to 0}\frac{1-\Phi_m(\underline{x},n;C)}{1-\Phi_h(\underline{x},n;C)} = 0$. Now

$$\begin{aligned}\frac{U_m(\underline{x},n_h^*(\underline{x});C)}{C} = \frac{(1-\Phi_m(\underline{x},n_h^*(\underline{x});C))\,v(n)}{C} &= \frac{1-\Phi_m(\underline{x},n_h^*(\underline{x});C)}{1-\Phi_h(\underline{x},n_h^*(\underline{x});C)}\frac{(1-\Phi_h(\underline{x},n_h^*(\underline{x});C))\,v(n)}{C} \\ &< \frac{1-\Phi_m(\underline{x},n_h^*(\underline{x});C)}{1-\Phi_h(\underline{x},n_h^*(\underline{x});C)}\frac{v(1)}{W_h},\end{aligned}$$

since from the capacity constraint $(1-\Phi_h(\underline{x},n_h^*(\underline{x});C))W_h < C$ and $v(n_h^*(\underline{x})) < v(1)$. Because $\lim_{C\to 0}\frac{1-\Phi_m(\underline{x},n;C)}{1-\Phi_h(\underline{x},n;C)} = 0$, $\lim_{C\to 0}\frac{U_m}{C} = 0$.

Let $(x_b(C), n_b(C))$ denote the rule implemented under a ban. It must be that $U_h(x_b,n_b;C) \geq \frac{C}{W+N}v\left(\frac{N}{W+N}\right)$, the utility high types would get by choosing $x = \infty$. Thus

$$\begin{aligned}\frac{1}{W+N}v\left(\frac{N}{W+N}\right) \leq \frac{U_h(x_b,n_b;C)}{C} &= \frac{(1-\Phi_h(x_b,n_b;C))\,v(n_b)}{C} \\ &= \frac{U_m(x_b,n_b;C)}{C}\frac{1-\Phi_h(x_b,n_b;C)}{1-\Phi_m(x_b,n_b;C)}.\end{aligned}$$

This implies that $\frac{U_h(x_b,n_b;C)}{C}$ is bounded from below above zero. We prove that $\frac{U_m(x_b,n_b;C)}{C}$ is also bounded from below above zero by contradiction. Suppose not, in which case the preceding equation implies that $\lim_{C\to 0}\frac{1-\Phi_h(x_b,n_b;C)}{1-\Phi_m(x_b,n_b;C)} = \infty$. Clearly this implies $\lim_{C\to 0}\frac{1-\Phi_h(x_b,n_b;C)}{1-\Phi_N(x_b,n_b;C)} \to \infty$ and also

$$\begin{aligned}\lim_{C\to 0}\frac{1-\Phi_h(x_b,n_b;C)}{N(1-\Phi_N(x_b,n_b;C))} &= \lim_{C\to 0}\frac{1-\Phi_h(x_b,n_b;C)}{C}\frac{C}{N(1-\Phi_N(x_b,n_b;C))} \\ &= \lim_{C\to 0}\frac{1-\Phi_h(x_b,n_b;C)}{C}\frac{1}{n_b} = \infty.\end{aligned}$$

Because $\frac{1-\Phi_h(x_b,n_b;C)}{C} < \frac{1}{W_h}$, from the capacity constraint $n_b \to 0$. This yields

$$\lim_{C\to 0}\frac{U_h(x_b,n_b;C)}{C} = \lim_{C\to 0}\frac{(1-\Phi_h(x_b,n_b;C))\,v(n_b)}{C} \leq \lim_{C\to 0}\frac{v(n_b)}{W_h} = 0,$$

which contradicts our lower bound on $\frac{U_h(x_h,n_h;C)}{C}$ from above. Thus, under affirmative action $\lim_{C\to 0}\frac{U_m}{C}=0$, while under a ban $\frac{U_m}{C}$ is bounded from below above zero, and hence when C is sufficiently small middle types vote to ban affirmative action. The argument for low types is identical and therefore omitted.

References

[1] Bagnoli, Mark and Ted Bergstrom. "Log-Concave Probability and Its Applications," mimeo, 1989.

[2] Barndorff-Nielsen, Ole E. and Neil Shephard. *Financial Volatility, Levy Processes and Power Variation.* Unpublished manuscript, 2002.

[3] Becker, Gary S. *The Economic Approach to Human Behavior.* The University of Chicago Press, 1976.

[4] Bobo, Lawrence and James R. Kluegel. "Opposition to Race-Targeting: Self-Interest, Stratification Ideology, or Racial Attitudes?" *American Sociological Review*, 58(4), August 1993, pages 443-464.

[5] Bowen, William and Derek Bok. *The Shape of the River: Long-Term Consequences of Considering Race in College and University Admissions.* Princeton, NJ: Princeton University Press, 1998.

[6] *CBS News/New York Times Monthly Poll, December 1997.* 2nd ICPSR version. New York, NY: CBS News (producer), 1997. Ann Arbor, MI: Inter-university Consortium for Political and Social Research (distributor), 2000.

[7] Chan, Jimmy and Erik Eyster. "Does Banning Affirmative Action Lower College Student Quality?" mimeo, Johns Hopkins University 2001.

[8] Coate, Stephen and Loury, Glenn. "Will Affirmative Action Policies Eliminate Negative Stereotypes," *American Economic Review* 83(5), 1993, pages 1220-1240.

[9] Blair, D. H. and D. L. Crawford. "Labor Union Objectives and Collective Bargaining," *Quarterly Journal of Economics* 94, pages 547-566.

[10] De Fraja, Gianni. "Education Policies:Equity, Efficiency and Voting Equilibrium," *Economic Journal*; 111(471), May 2001.

[11] Fang, Hanming and Peter Norman, "Government-Mandated Discriminatory Policies," mimeo, University of Wisconsin, October 2001.

[12] Fernandez, Raquel, "Education and Borrowing Constraints: Tests vs Prices," *NBER Working Paper*, No. 6588, June 1998.

[13] Gans, Joshua S. and Michael Smart, "Majority Voting with Single-Crossing Preferences," *Journal of Public Economics*; 59(2), February 1996, pages 219-37.

[14] Kane, Thomas. "Racial and Ethnic Preferences in College Admissions," in *The Black-White Test Score Gap*, C. Jencks and M. Phillips, eds. Washington, DC: Brookings Press, 1998.

[15] Lundberg, Shelly. "The Enforcement of Equal Opportunity Laws Under Imperfect Information: Affirmative Action and Alternatives," *Quarterly Journal of Economics* 106, February 1991, pages 309-326.

[16] Roberts, Kevin W.S. "Voting over Income Tax Schedules." *Journal of Public Economics*; 8(3), Dec. 1977, pages 329-40.

[17] Sax, Linda J. and Marisol Arredondo. "Students Attitudes Toward Affirmative Action in College Admissions," Research in Higher Education, 40(4), 1999, pages 439-459.

[18] Vars, Frederick E. and William G. Bowen. "Scholastic Aptitude Test Scores, Race and Academic Performance in Selective Colleges and Universities," in *The Black-White Test Score Gap*, C. Jencks and M. Phillips, eds. Washington, DC: Brookings Press, 1998.

[19] Walker, Bruce. "Implementation and Results of HB 588 at The University of Texas at Austin, Report Number 2: Academic Performance and Persistence of Top 10% Students, Academic Year 1998-1999 and Fall 1999," <www.utexas.edu/student/research/reports/admissions/HB5882000329.html>.

[20] Wilgoren, Jodi. "Texas' Top 10% Law Appears to Preserve College Racial Mix," in *The New York Times*, November 24, 1999.

[21] Zwick, Rebecca. "Is the SAT a 'Wealth Test'?" mimeo, UC Santa Barbara, December 2001.

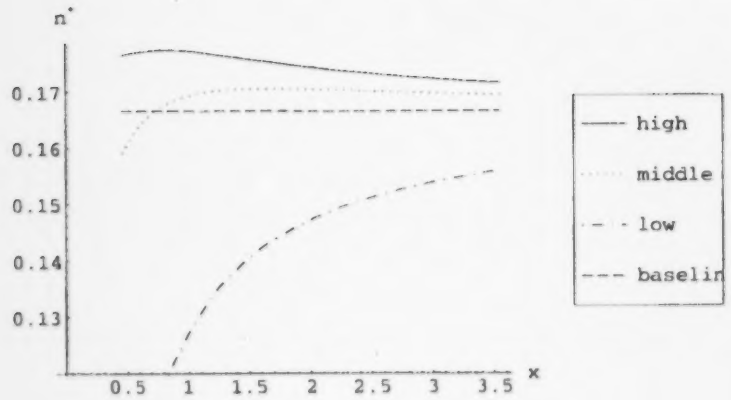

Figure 1:

Figure 1 uses the following parameters: for each $i \in I$, $W_i = 1$, $C = 0.5$, $\varepsilon \sim N(0,1)$, $\lambda_h = 0.8$, $\lambda_m = 0.7$, $\lambda_l = 0$ and $v(n) = n^{0.2}$.

Table 1: Selected Items and Summary Statistics

Q19: How important do you think it is for a COLLEGE to have a racially diverse student body --- that is a mix of blacks, Asians, Hispanics and other minorities? Not at all important: 98 (0.122), Not too important: 109 (0.135), Somewhat important: 289 (0.359), Very important: 291 (0.361), Do not know/Not available: 19 (0.024).
Q34: Suppose a white student and a black student are equally qualified, but a college can only admit one of them. Do you think the school should admit the black student in order to achieve more racial balance in the college, or do you think racial balance should not be a factor? Race should not be factor: 546 (0.677), Admit Black: 150 (0.186), Depends: 43 (0.053), Do not know/Not available: 67 (0.083).
Q42: Do you favor or oppose high schools and colleges providing special educational programs to assist minorities in competing for college admissions? Oppose: 239 (0.297), Favor: 509 (0.632), Do not know/Not available: 58 (0.072).
Q44: Do you favor or oppose employers and colleges using outreach programs to hire minority workers and find minority students? Oppose: 243 (0.301), Favor: 471 (0.584), Do not know/Not available: 92 (0.114).
Q50: In general, in hiring, promoting and college admissions, do you think it is a good idea or a bad idea to select a person from a POOR family over a person from a middle class or rich family if the person from the poor family and the person from the middle or rich family are equally qualified? Bad idea: 235 (0.292), Good idea: 414 (0.514), Do not know/Not available: 157 (0.195).

Note: Number of respondents: 806. The numbers in parentheses are the fraction of respondents giving a particular answer.
Sources: The CBS News/New York Times Monthly Poll, December 1997.

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Table 2: Attitudes towards Affirmative Action

Variable	*(1)*[a]	*(2)*[b]	*(3)*[c]	*(4)*[d]	*(5)*[e]
High School +	0.325	0.254	0.499	1.002	1.580*
	(0.402)	(0.406)	(0.416)	(0.803)	(1.091)
College +	1.104***	1.005***	1.291***	1.568**	2.372***
	(0.403)	(0.407)	(0.422)	(0.811)	(1.099)
Female		-0.051	-0.221	0.287	-0.342
		(0.189)	(0.201)	(0.330)	(0.356)
Age		-0.013**	-0.009	0.033	-0.001
		(0.007)	(0.007)	(0.0240)	(0.018)
California		0.327**	0.233	0.512*	0.515
		(0.199)	(0.211)	(0.330)	(0.373)
Child		0.111	0.185		
		(0.208)	(0.220)		
D1			1.514**	1.347	1.167
			(0.802)	(1.133)	(1.168)
D2			2.480***	2.370***	1.782**
			(0.736)	(1.050)	(1.073)
D3			3.213***	2.647***	2.928***
			(0.733)	(1.053)	(1.052)
Constant	-1.910***	-1.358*	-4.239***	-6.150***	-5.094***
	(0.379)	(0.559)	(0.921)	(1.590)	(1.680)

Notes: Estimates are based on a binary-logit model whose dependent variable is an indicator based on the response to Q34. (See Table 1 for exact wording.) It takes on the value of 1 if the the black student should be admitted and 0 if race should not matter. Uncertain responses (*Depends*, *Do not know*) have been dropped. *High School +* is an indicator for high school graduate without a college degree. *College +* is an indicator for college graduate. *Female* is an indicator for females. *Age* measures the respondent's age. *California* is an indicator for California resident. *Child* indicates children under 18 in the household. *D1*, *D2* and *D3* are indicators based on Q19 corresponding to responses that a racially diverse student body is "not too important," "somewhat important," or "very Important," respectively. The baseline case corresponds to the response that a diverse student body is "not at all important."
* Indicates statistical significance above the 0.15 level; ** indicates statistical significance above the 0.1 level; *** indicates statistical significance above the 0.05 level. Standard errors are in parenthesis.

a. Sample includes only non-Hispanic whites aged 25 or above. Observations = 696. Pseudo R^2 = 0.0272.
b. Same sample as in (1). Observations = 696. Pseudo R^2 = 0.0381.
c. Same sample as in (1) and (2). Observations with missing item 19 are dropped. Observations = 681. Pseudo R^2 = 0.1233.
d. Sample includes only non-Hispanic whites between the age of 25 and 55 living with children under 18. Observations = 253. Pseudo R^2 = 0.1097.
e. Sample includes only non-Hispanic whites between the age of 25 and 55 not living with children under 18. Observations = 214. Pseudo R^2 = 0.1537.

Sources: Same as Table 1.

Table 3: Attitudes towards Minority Outreach and Class-Based Affirmative Action Programs

Variable	*Q42* [a]	*Q44* [b]	*Q50* [c]
High School +	-0.158	0.322	-0.005
	(0.311)	(0.302)	(0.306)
College +	0.267	0.323	0.163
	(0.327)	(0.314)	(0.321)
Female	0.108	0.190	0.342***
	(0.166)	(0.167)	(0.171)
Age	0.008	0.000	-0.000
	(0.006)	(0.006)	(0.006)
California	0.375***	0.053	-0.294
	(0.183)	(0.181)	(0.181)
Child	-0.269	-0.067	-0.224
	(0.189)	(0.190)	(0.195)
D1	0.729***	0.219	0.682***
	(0.302)	(0.300)	(0.336)
D2	0.793***	0.850***	0.659***
	(0.249)	(0.255)	(0.286)
D3	1.481***	1.586***	0.991***
	(0.261)	(0.270)	(0.291)
Constant	-0.624	-0.599	-0.165
	(0.513)	(0.515)	(0.525)

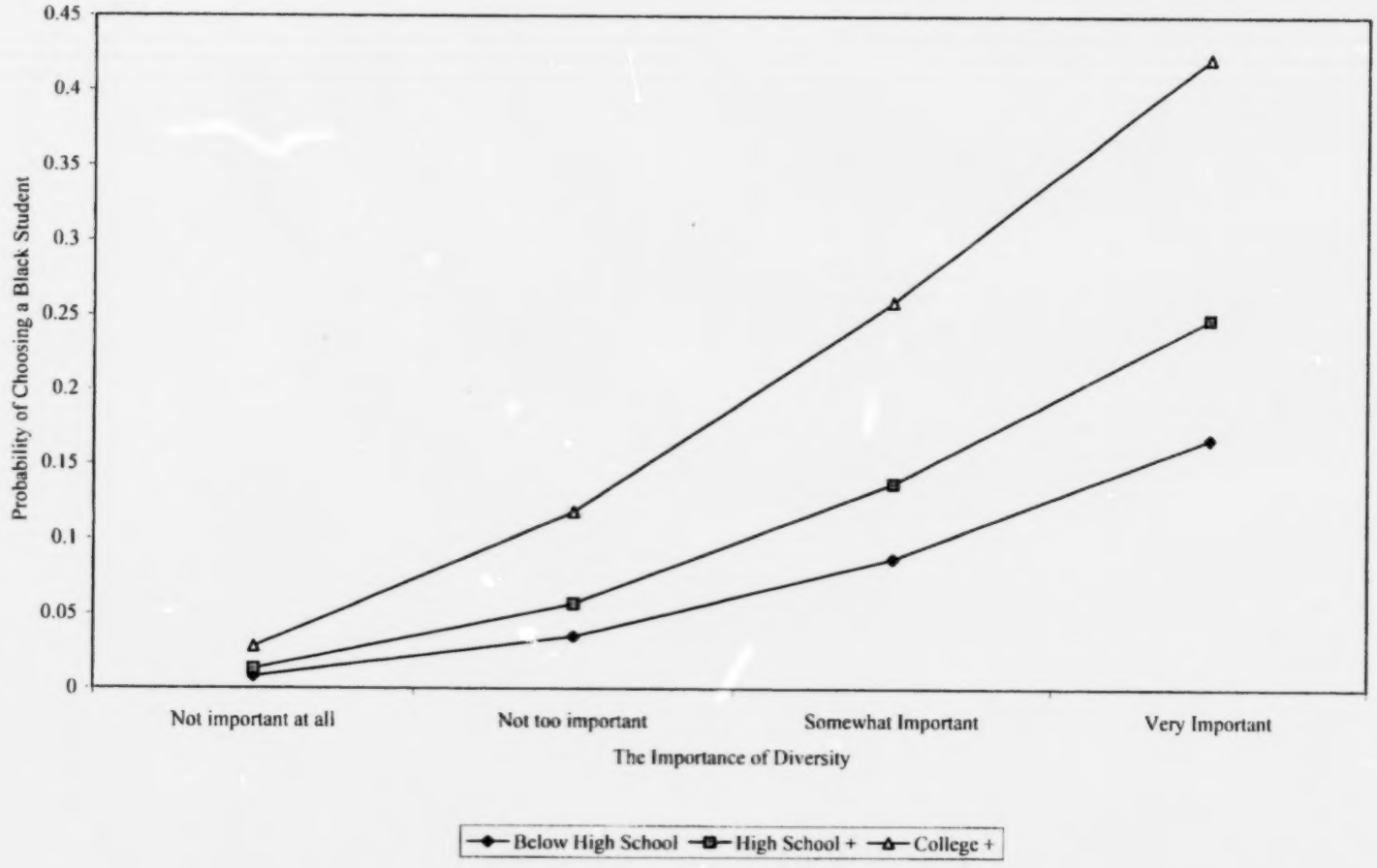
Notes: Estimates are based on a binary-logit model. The dependent variable is support for the program mentioned in the Q42, 44, or 50. (The exact wording is in Table 1.) Uncertain responses such as *Do not know/Not Available* have been dropped. The sample includes only non-Hispanic whites aged 25 or above. The notation is identical to that in Table 2, with standard errors in parenthesis.

a. Observations = 734. Pseudo R^2 = 0.0587.
b. Observations = 702. Pseudo R^2 = 0.0599.
c. Observations = 634. Pseudo R^2 = 0.0254.

Sources: Same as Table 1

Figure x

Figure 2: Predicted Probability of Choosing a Black Student



Notes: Ordinates represent the probability of choosing a black student for a forty-year old female non-California resident who are not living with children under 18. Calculations based on column 3 of Table 2.

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Organization/Address: Johns Hopkins University, 3400 North Charles Street, Baltimore, MD 21218	Telephone: 410 516 7610 FAX: 410 516 7600
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